

PLANKTON INVESTIGATIONS

The planktonic organisms as a group are the first link in the marine food chain and are, accordingly, all important to those animals higher up in the food chain. The success or failure of the plankton crop may in the long run turn out to be the most decisive factor in the success or spawn of many species of fish.

Studies of the plankton organisms are desired as well to elucidate environmental changes. Various plankters have been demonstrated to be more sensitive indicators of changing hydrographic conditions than many of the instruments designed by man. Little work has been done along this line in our area of interest.

August 6, 1959

SUMMARY C ROL SCHEDULE

Investigation: Plankton
Biological Laboratory: Woods Hole, Mass.

Project Title	Est.* Cost	Fiscal Years										
		57	58	59	60	61	62	63	64	65	66	
1. Phytoplankton studies	21.5	8.6	8.3	4.6	--	--	--	--	--	--	--	
2. Zooplankton studies	26.5	12.3	7.7	6.5	--	--	--	--	--	--	--	
3. Fate of haddock eggs and larvae	87.9	30.5	9.7	9.0	18.7	--	--	--	--	--	--	
4. Development of Plankton sampler	33.3	--	9.7	7.0	16.6	--	--	--	--	--	--	
5. Larval studies	33.5	--	9.7	7.2	16.6	--	--	--	--	--	--	
6. Vertical distribution of plankton	47.5	--	--	7.3	17.1	23.1	--	--	--	--	--	
7. Study of indicator species	65.0	--	--	--	--	23.3	26.8	14.9	--	--	--	
8. Distribution and biology of Cyanea	81.7	--	--	--	--	23.3	26.8	13.9	17.7	--	--	
9. Seasonal distribution of eggs and larvae (all species)	109.4	--	--	--	--	--	26.0	12.2	17.7	26.7	26.8	
10. Food supply studies of pelagic fish	81.6	--	--	--	--	--	--	10.9	17.3	26.5	26.9	
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*Total needed by Laboratory for Project in thousands of dollars.

#714 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Phytoplankton studies

Investigation Title: Plankton Ecology

Investigation Chief: ~~J. B. Cotton~~ Vacant

Project Leader:	<u>J. B. Cotton Vacant</u>	<u>F. R. B.</u>	<u>GS-11</u>
	Name	Title	Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: Phytoplankton is one of the important links in the food chain in the ocean. We must know something of its distributions and fluctuations to aid us in our understanding of the ecology of the area.

Objective: To study the most abundant species of phytoplankton present in the Gulf of Maine and Georges Bank area.

Method of Procedure: Started 1957 - 1959 (Discontinued). From Hardy Plankton Recorder gauges wash off phytoplankton and do a qualitative and quantitative analysis of Phase 1: the data. Work was discontinued due to lack of funds and need for emphasis of other plankton studies.

Phase 2:

Plankton - 1

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 21.5

	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services	<u>0.5</u>	<u>--</u>	<u>--</u>
Other Expenses:			
Within Project	<u>--</u>	<u>--</u>	<u>--</u>
Lab. Adm. & Ser.	<u>4.1</u>	<u>--</u>	<u>--</u>
Lab. Total	<u>4.6</u>	<u>--</u>	<u>--</u>
Regional Office	<u>.046</u>		
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY 59

Recommended by:

		Date
Originator	<u>John B. Colton</u>	<u>8/6</u>
Investigation Chief	<u>John B. Colton</u>	<u>8/</u>
Laboratory Director	<u>Herbert W. Graham</u>	<u>8/6/59</u>
Regional Director	<u>Joseph F. Parnell</u>	<u>8/19/59</u>
Branch Chief	<u>WHE</u>	<u>12-24-59</u>
Approved by:		
Division Chief for Director		

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Zooplankton studies

Investigation Title: Plankton ecology

Investigation Chief: ~~W. B. Coker~~ Vacant

Project Leader:	<u>R. R. Marak</u>	<u>F. R. B.</u>	<u>GS-9</u>
	Name	Title	Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: A knowledge of the zooplankton of the Gulf of Maine and Georges Bank must be attained in order to understand better the relationship of the larval fish to its environment with special attention given to the food habits of these fish.

Objective: To study the food habits of larval cod, haddock, and pollock.

Method of Procedure: Started 1957 - Completed 1959. Examine stomachs of cod, haddock and pollock obtained in 1-meter net tows over the area. Tabulate what Phase 1 food is being eaten. Relate food eaten to fish eating it. Work completed and manuscript ready for publication.

Phase 2:

Plankton - 2

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 26.5

	<u>FY 1959</u>	<u>FY 1960</u>	<u>FY 1961</u>
Personal Services	<u>2.5</u>	<u>--</u>	<u>--</u>
Other Expenses:			
Within Project	<u>--</u>	<u>--</u>	<u>--</u>
	<u>--</u>	<u>--</u>	<u>--</u>
Lab. Adm. & Ser.	<u>4.0</u>	<u>--</u>	<u>--</u>
Lab. Total	<u>6.5</u>	<u>--</u>	<u>--</u>
Regional Office	<u>.065</u>		
Washington Office			
Total			

Recommended Source of Funds S-K End Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY; Phase 2 FY; Phase 3 FY; Project FY 59

Recommended by:

Originator	<u>John B. Colton</u>	<u>8/6</u>	<u>Date</u>
Investigation Chief	<u>John B. Colton</u>		
Laboratory Director	<u>Herbert W. Graham</u>	<u>8/6/59</u>	
Regional Director	<u>Joseph R. Deane</u>	<u>8/19/59</u>	
Branch Chief	<u>WSE.</u>	<u>12-24-59</u>	
Approved by:			
Division Chief for Director	<u></u>		

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Fate of haddock eggs and larvae

Investigation Title: Plankton ecology

Investigation Chief: ~~J. B. Cotton~~ Vacant

Project Leader:	<u>J. B. Cotton Vacant</u>	<u>F. R. B.</u>	<u>GS-11</u>
	Name	Title	Grade

Assistants: (Title and Grade)

R. R. Marak, F. R. B., GS-9

D. Miller, F. R. B., GS-9

Collaborators:

Need for Information: A method for predicting the strength of a year class of fish is greatly needed in order to aid commercial fishermen.

Objective: To determine the causes and fluctuations in strength of year classes.

Method of Procedure: Started 1957 - End in 1960. Plankton-hydrographic surveys during and following the spawning season. Report published in 1959 on Heat death Phase 1: of Larvae. SSR's being prepared for completion in 1960.

Phase 2:

Plankton - 3

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 87.9

	<u>FY 1959</u>	<u>FY 1960</u>	<u>FY 1961</u>
Personal Services	<u>6.0</u>	<u>4.6</u>	<u>--</u>
Other Expenses:			
Within Project	<u>3.0</u>	<u>0.5</u>	<u>--</u>
	<u>--</u>	<u>--</u>	<u>--</u>
Lab. Adm. & Ser.	<u>10.0</u>	<u>13.6</u>	<u>--</u>
Lab. Total	<u>19.0</u>	<u>18.7</u>	<u>--</u>
Regional Office	<u>.19</u>	<u>.187</u>	
Washington Office			
Total			

Recommended Source of Funds S&K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY ; Phase 2 FY ; Phase 3 FY ; Project FY 60

Recommended by: _____ Date _____
Originator John B. Colton

Investigation Chief ~~John B. Colton~~

Laboratory Director Herbert W. Graham 8/6/59

Regional Director Joseph F. Dumeret 8/19/59

Branch Chief WHE 12-24-59

Approved by: _____
Division Chief for Director WHE

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Development of Plankton samplers

Investigation Title: Plankton ecology

Investigation Chief: ~~W. E. Collins~~ Vacant

Project Leader:	<u>D. Miller</u>	<u>FRB</u>	<u>GS-9</u>
	Name	Title	Grade

Assistants: (Title and Grade)

Collaborators: National Bureau of Standards, Capacity, Density and Fluid Meters Section, and Woods Hole Oceanographic Institution.

Need for Information: There is always a need to produce instruments which can improve our collecting methods.

Objective: To develop better instruments for collection of plankton at surface and subsurface levels.

Method of Procedure: Started 1958 - Finish 1960. Design in consultation with National Bureau of Standards, Capacity, Density and Fluid Meters Section and Phase 1: Woods Hole Oceanographic Institution a Hi-Speed plankton sampler. Report published on Kite Otter multiplane depressor and paper on Hi-Speed sampler to be out in 1960.

Phase 2:

Plankton 4

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project 33.3

	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services	<u>2.5</u>	<u>2.5</u>	<u>---</u>
Other Expenses:			
Within Project	<u>0.5</u>	<u>0.5</u>	<u>---</u>
Lab. Adm. & Ser.	<u>4.0</u>	<u>13.6</u>	<u>---</u>
Lab. Total	<u>7.0</u>	<u>16.6</u>	<u>---</u>
Regional Office	<u>.07</u>	<u>.166</u>	<u>---</u>
Washington Office	<u>---</u>	<u>---</u>	<u>---</u>
Total	<u>---</u>	<u>---</u>	<u>---</u>

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY58; Phase 2 FY; Phase 3 FY; Project FY 60

Recommended by: _____ Date _____

Originator John B. Colton

Investigation Chief ~~John B. Colton~~

Laboratory Director Herbert W. Graham 8/6/59

Regional Director Joseph F. Penick 8/19/59

Branch Chief HJE 12-24-59

Approved by: _____

Division Chief for Director HJE

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Larval studies

Investigation Title: Plankton ecology

Investigation Chief: ~~J. B. Collier~~ Vacant

Project Leader:	<u>D. Miller</u>	<u>F. R. B.</u>	<u>GS-9</u>
	Name	Title	Grade

Assistants: (Title and Grade)

Collaborators:

Need for Information: In order to understand more about the early life history of the haddock we must know of their interrelation with other organisms (principally other larval fish).

Objective: To describe the larval stages of all species commonly found on Georges Bank in the spring of the year.

Method of Procedure: Start 1958 - End 1960. Examination of plankton samples, removing all larvae for identification. Strip and fertilize eggs of mature fish
Phase 1: (for larvae of known parentage). Culture larvae aboard ship and ashore for identification purposes. Key to be published in 1960.

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project			<u>33.5</u>
	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services	<u>3.0</u>	<u>2.5</u>	<u>---</u>
Other Expenses:			
Within Project	<u>0.2</u>	<u>0.5</u>	<u>---</u>
Lab. Adm. & Ser.	<u>1.0</u>	<u>13.6</u>	<u>---</u>
Lab. Total	<u>7.2</u>	<u>16.6</u>	<u>---</u>
Regional Office	<u>.072</u>	<u>.166</u>	<u>---</u>
Washington Office	<u>---</u>	<u>---</u>	<u>---</u>
Total	<u>---</u>	<u>---</u>	<u>---</u>

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 58; Phase 2 FY; Phase 3 FY; Project FY 60

Recommended by: _____ Date _____
 Originator John B. Colton
 Investigation Chief ~~John B. Colton~~
 Laboratory Director Herbert W. Graham
 Regional Director Joseph G. Dumeril
 Branch Chief JHE 12-24-57
 Approved by: _____
 Division Chief for Director _____

Remarks

(Continue on reverse side)

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Vertical distribution of plankton

Investigation Title: Plankton ecology

Investigation Chief: Vacant

Project Leader:	<u>R. R. Marak</u>	<u>F. R. B.</u>	<u>GS-9</u>
	<u>Name</u>	<u>Title</u>	<u>Grade</u>

Assistants: (Title and Grade)

F. R. B. GS-9 60% time

Collaborators:

Need for Information: In order to gain a more thorough knowledge of the ecology of the water column we must know about the vertical distribution of these animals and their relation to one another. Also, we must know more about these animals vertical movements so that we might more effectively sample them.

Objective: To sample the Georges Bank area with hi-speed samplers at various depths simultaneously.

Method of Procedure: Start 1959, end 1961. Tow hi-speed samplers at 0-10-20-30-40-50-75-100 meters at specific locations in spawning grounds and nursing grounds.
Phase 1: Analyze data collected.
Prepare scientific publication of results.

Phase 2:

Plankton 6

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs:	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Total Needed by Laboratory for Complete Project			<u>47.5</u>
Personal Services	<u>3.0</u>	<u>4.0</u>	<u>4.3</u>
Other Expenses:			
Within Project	<u>0.3</u>	<u>0.5</u>	<u>1.5</u>
Lab. Adm. & Ser.	<u>1.0</u>	<u>12.6</u>	<u>17.3</u>
Lab. Total	<u>7.3</u>	<u>17.1</u>	<u>23.1</u>
Regional Office	<u>.073</u>	<u>.171</u>	<u>.231</u>
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 59; Phase 2 FY; Phase 3 FY; Project FY 61

Recommended by: John B. Colton Date
Originator

Investigation Chief	Joseph B. Graham	
Laboratory Director	<u>Herbert W. Graham</u>	<u>8/6/59</u>
Regional Director	<u>Joseph B. Graham</u>	<u>8/19/59</u>
Branch Chief	<u>WHE.</u>	<u>12-24-57</u>
Approved by:		
Division Chief for Director	<u>H. H.</u>	

Remarks

(Continue on reverse side)

#715 7/9/59

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Study of Indicator Species

Investigation Title: Plankton

Investigation Chief: Vacant

Project Leader:	<u>Vacant</u>	<u>F. R. B.</u>	
	<u>Name</u>	<u>Title</u>	<u>Grade</u>

Assistants: (Title and Grade)

F. R. B. GS-11 50% time

Collaborators: Hydro surveys.

Need for Information: To supplement hydrographic information on water movements in our area of investigation.

Objective: To find species which may be used as indicators of water movements.

Method of Procedure: Start 1961, complete in 1963. Analyze data from Plankton surveys and find, if possible, animals which can be used to trace water movements. Cooperation with hydro team or alone on publication.

Phase 1:

Phase 2:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs: Total Needed by Laboratory for Complete Project			65.0
	FY 1959	FY 1960	FY 1961
Personal Services	---	---	4.5
Other Expenses:			
Within Project	---	---	1.5
Lab. Adm. & Ser.	---	---	17.3
Lab. Total	---	---	23.3
Regional Office			.233
Washington Office			
Total			

Recommended Source of Funds S-K and Regular
 (S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY 61; Phase 2 FY; Phase 3 FY; Project FY 63

Recommended by: _____ Date _____

Originator John B. Colton

Investigation Chief ~~John B. Colton~~

Laboratory Director Herbert W. Graham 8/6/59

Regional Director Joseph H. Pomeroy 8/19/59

Branch Chief WHE. 12-24-59

Approved by: _____

Division Chief for Director WHE.

Remarks

(Continue on reverse side)

*Specify species.**Very little
laboratory work
has been done yet*

U. S. Fish and Wildlife Service
Bureau of Commercial Fisheries

Sheet No. 1

Location: Woods Hole, Mass.
Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Biology and distribution of Cyanea

Investigation Title: Plankton

Investigation Chief: Vacant

Project Leader:	<u>Vacant</u>	<u>F. R. B.</u>	
	<u>Name</u>	<u>Title</u>	<u>Grade</u>

Assistants: (Title and Grade)

F. R. B. GS-9 full time

Collaborators:

Need for Information: Because there is some definite relationship between some fish larvae and this large jelly fish; the biology and distribution of this organism should be studied.

Objective: To study how and where this animal (Cyanea) is distributed and why when young 20 to 100 mm. haddock are found in quantity they are always taken along with Cyanea.

Method of Procedure: Start 1961, complete in 1964. Analyze survey records of observations and possibly catch of Cyanea. Supplement with

Phase 1: cruises (2), one in late spring, one late summer (one week long) to trace movements of these animals and collect data about ecology of the area in which they are living. Use 1 meter nets, mid depth trawls and try new gear which might sample the animals more adequately.

Phase 2:

Plankton 8

Sheet No. 2

File No.:

Method of Procedure: (Cont'd)

Phase 3:

Estimated Costs:	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Total Needed by Laboratory for Complete Project			<u>81.7</u>
Personal Services	<u>---</u>	<u>---</u>	<u>5.0</u>
Other Expenses:			
Within Project	<u>---</u>	<u>---</u>	<u>1.0</u>
Lab. Adm. & Ser.	<u>---</u>	<u>---</u>	<u>17.3</u>
Lab. Total	<u>---</u>	<u>---</u>	<u>23.3</u>
Regional Office	<u>---</u>	<u>---</u>	<u>.233</u>
Washington Office	<u>---</u>	<u>---</u>	<u>---</u>
Total	<u>---</u>	<u>---</u>	<u>---</u>

Recommended Source of Funds S-K and Regular
(S-K, Regular, Contributed, etc.)

Estimated Date of Completion: Phase 1 FY⁶¹; Phase 2 FY; Phase 3 FY; Project FY⁶⁴

Recommended by: _____ Date _____

Originator John B. Colton

Investigation Chief ~~John B. Colton~~

Laboratory Director Herbert W. Graham 8/6/59

Regional Director Joseph F. Pomeroy 8/19/59

Branch Chief HBE 12-24-59

Approved by: _____

Division Chief for Director HBE 12-24-59

Remarks

(Continue on reverse side)

#715 7/9/59